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Sero - prevalence of hepatitis B and C viruses infection and associated risk factors among military personnel at Bahir Dar armed forces general hospital, Northwest Ethiopia

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A thesis submitted to the Department of Medical Microbiology, School of Biomedical and Laboratory Sciences, College of Medicine and Health Sciences, University of Gondar in partial fulfillment of the requirements for the degree of Masters of Science in Medical Microbiology**.**

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College of Medicine and Health Sciences
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CERTIFICATE

This is to certify that the thesis entitled "**Sero - prevalence of hepatitis B and C viruses infection and associated risk factors among military personnel at Bahir Dar armed forces general hospital, Northwest Ethiopia**" submitted by **Tigist Birku** for MSc., Degree in Medical Microbiology was carried out under our supervision and the thesis has not been previously submitted in part or full for any degree or diploma of this or any other University.

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Date: _____

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List of abbreviations

DNA	Deoxyribonucleic Acid
HBsAg	Hepatitis B Surface antigen
HBV	Hepatitis B Virus
HCC	Hepatocellular Carcinoma
HCV	Hepatitis C Virus
HIV	Human Immunodeficiency Virus
OPD	Outpatient Department
ORF	Open Reading Frames
RNA	Ribonucleic Acid
STIs	Sexually Transmitted Infections
TTIs	Transfusion Transmissible Infections
WHO	World Health Organization

Abstract

Introduction: Hepatitis B virus and hepatitis C virus are major etiological agents of chronic liver disease and hepatocellular carcinoma. Hepatocellular carcinoma is the fifth most prevalent tumor type and the third leading cause of cancer-related deaths worldwide. Living in military camps and being at a greater risk of injury and hospitalization are potential risk factors for acquiring HBV and HCV infections. The risk of sharing utensils like razors and toothbrushes, traditional malpractices and unsafe sexual practices may contribute for the transmission of HBV and HCV among military personal living in military camps which can also serve potential source for the transmission of the viruses to the general community at large.

Objective: The objective of this study was to determine the prevalence and associated risk factors of HBV and HCV infection among military personnel at Bahir Dar armed forces general hospital, Northwest Ethiopia.

Methods: A Cross sectional study was conducted from February – May, 2015 among military personal at Bahir Dar armed forces general hospital. Based on a systematic random sampling technique a total of 403 study participants were included. Hepatitis B and C virus infection was determined using HBsAg and anti-HCV antibody test using rapid test. Socio demographic data and associated factors were collected through interview using structured questionnaire. Data was entered and analyzed using SPSS version 20.The P- value < 0.05 was considered statistically significant.

Results: Of the total of 403 military personnel enrolled, the prevalence of HBsAg and anti HCV antibody was 4.2% (17/403) and 0.2% (1/403) respectively. Among the total participants positive for viral hepatitis, 4.9% were females and 4.4% were males with the age range of 20-52 years. In multivariate linear regression analysis revealed that unsafe sexual practice was significantly associated with viral hepatitis infection (AOR= 5.126, 95% CI 1.306, 20.126 p=0.019).

Conclusion: The prevalence of hepatitis B and hepatitis C virus infection was intermediate and low among military personnel respectively. Routine screening for HBV and HCV in military should be implemented and the prevention of the disease should be practiced.

Key words: HBV, HCV, Military personnel

1. Introduction

1.1. Background

Viral hepatitis is an inflammation of the liver due to viral infections and there are groups of viruses that affect the liver. The most common types are hepatitis B virus (HBV) and hepatitis C virus (HCV) (1). Viral hepatitis is a major health problem worldwide and cause acute and/or chronic hepatitis which can leads to the development of extensive liver scarring (cirrhosis), liver failure, liver cancer and death (2).

Hepatitis B virus is first identified in the 1960s by Baruch Samuel Blumberg from an Australian Aborigine. Hepatitis B virus (HBV) the Dane particle, is a spherical lipid-containing structure with an outer diameter of 42 to 47 nm (3). It is deoxyribonucleic acid (DNA) virus belonging to a family called *Hepadnaviridae* which can cause acute or chronic infection (4). Hepatitis B virus is a circular, partially double-stranded, DNA genome consisting of four major partially over lapping open-reading frames that code for four completely different proteins: PreS1, PreS2/S, Precore/C, DNA polymerase and the X protein (S, C, X, P). The envelope proteins (PreS1 and PreS2/S) are expressed on the surface of hepatitis B surface antigen (HBsAg) positive particles and have been shown to be highly immunogenic (5). Antibodies against HBV proteins are other immunological markers of infection, of which anti-Hepatitis B core antigen, Hepatitis B envelope antigen and Hepatitis B envelope antibody are also identified shortly after HBSAg, and are important markers of past or present HBV infection (6).

The core protein has a structural function, but may play other important roles in the viral lifecycle. Binding of the core protein to HBV RNA/DNA may be involved in nuclear/cytoplasmic transfer, viral morphogenesis and packaging as well as down regulation of transcription of viral and cellular genes (5). The hepatitis B virus (HBV) is a hepatotropic DNA virus that causes acute and chronic hepatitis and hepatocellular carcinoma (7). The direct role for HBV in liver cell transformation is controversial. The discovery and demonstration that HBV DNA integrates into the DNA of the host hepatocytes was reported to led to HCC (8).

HBV has been classified into 7 genotypes that is A to G, based on the divergence of entire genome sequence and HBV genotypes have distinct geographical distributions. Studies reported a correlation of HBV genotypes with HBeAg clearance, liver damage, and the response to IFN treatment. It was reported that HBeAg carrier status tends to be longer and the prevalence of

HBeAg appears higher in patients with genotype C than with genotype B (9) . HBV carriers with genotype B have lower histologic activity scores and genotype C is more prevalence in patients with cirrhosis. HBV genotype B is associated with a higher rate of IFN-induced HBeAg clearance compared with genotype C. The response of different HBV genotypes to interferon-alfa treatment is of increasing interest because the benefit of interferon-alfa or its pegylated form in combination with other antiviral agents is being explored in the treatment of chronic hepatitis B (10).

The HBV is transmitted through exposure to infectious blood, semen, and other body fluids. Hepatitis B virus can also be transmitted from infected mothers to infants or from family members to infants in early childhood. Transmission may also occur through unsafe sexual intercourse, transfusions of HBV-infected blood and blood products, contaminated injections during medical procedures, and sharing of needles and syringes among injecting drug users (11), (12) .

Hepatitis C virus is a small single-stranded ribonucleic acid (RNA) virus that belongs to the *Flaviviridae* family (13) . This virus is mostly transmitted through exposure to infectious blood. This may happen through transfusions of HCV-infected blood and blood products, contaminated injections during medical procedures, and sharing of needles and syringes among injecting drug users. Vertical transmission from infected mother to fetus or transmissions through unsafe sexual contact are other possible modes of transmission of the virus. Infection with HCV is a major cause of chronic hepatitis around the world. HCV RNA has been unequivocally detected in the hepatocytes of liver biopsies of chronically infected patients and chimpanzees, the HCV genome has also been suggested to replicate in cells of lymphoid origin and dendritic cells (14). HCV-mediated liver injury is caused by a diverse and complex array of factors. These factors include viral gene products that have direct intracellular and extracellular effects on apoptosis and steatosis in hepatocytes, the involvement of non hepatocytes in the fibrotic cascade, and the cytotoxic lymphocyte response (both innate and adaptive immune features) to HCV infection. Infection with HCV is persistent in most individuals because HCV successfully undermines host innate and viral - specific immunity. Chronic HCV infection manifests as variable degrees of hepatic inflammation and fibrosis, and as an increased risk of developing cirrhosis and hepatocellular carcinoma (HCC) (15) .

Hepatitis C can be classified into six genotypes. It is important to note an infected person's specific genotype as it affects treatment dose, duration, and response. Genotypes 1–3 have a worldwide distribution. Genotypes 1a and 1b are the most common, accounting for about 60% of global infections. They predominate in Northern, Southern, and Eastern Europe; North America; and Japan. Genotype 2 is less frequently represented than genotype 1 and is often associated with the risk factor of prior blood transfusion. Type 3 is common in Southeast Asia and is variably distributed in different countries. Genotype 4 is principally found in the Middle East, Egypt, North and Central Africa. Type 5 is found almost exclusively in South Africa, and genotype 6 is distributed throughout Asia (16) .

Treatment achieves sustained virological response, which means viral eradication, in 55%–60% of patients with chronic HCV infection. New triple combinations including HCV protease inhibitors have increased the sustained response rates by approximately 30% in difficult to treat, naive and treatment experienced patients infected with HCV genotype 1. Future treatment options are expected to further improve the sustained virological response rates to over 90% in all HCV patients .However, only a small proportion of patients receive treatment and therefore the treatment efficacy at the global or community level effectiveness remains poor (17) .

1.2. Statement of the problem

Hepatitis B virus (HBV) and hepatitis C virus (HCV) are major etiological agents of chronic liver disease and hepatocellular carcinoma (HCC). Hepatocellular carcinoma (HCC) is the fifth most prevalent tumor type and the third leading cause of cancer-related deaths worldwide (18). Viral hepatitis is now responsible for 1.4 million deaths every year (compared with 1.6 million deaths from HIV/AIDS, 1.3 million from tuberculosis and 0.6 million from malaria) (19).

World Health Organization (WHO) estimates that about two billion people have been infected with HBV worldwide and (12) more than 240 million people are chronically infected with the virus. About 500 000 - 700 000 people die annually as a result of HBV infection (11) . HBV infection has an acute case fatality rate of 0.5 - 1.0%, while 2 - 10% of cases end up in chronic infection after 5 years. Premature mortality from chronic liver disease occurs in 15 - 25% of chronically infected persons (20) .

About 150, 000,000 people are chronically infected with HCV worldwide. More than 350 000 people are estimated to die from HCV-related liver diseases each year (11) . According to recent

estimates, more than 185 million people around the world have been infected with HCV, of whom 350 000 die each year (21). The prevalence of hepatitis C infection varies substantially around the world. When countries are grouped into Global burden of disease regions, the estimated prevalence of HCV infection is highest in Central and East Asia and in the North ./Africa/Middle East regions. In view of the larger populations in Asia, the South Asia and East Asia regions have by far the largest number of persons living with HCV infection (22). The prevalence of hepatitis C is even higher in some areas, reaching levels of up to 10% (21).

The prevalence of HBV infection varies greatly in different regions of the world and it is highly endemic in areas such as sub-Saharan Africa, Asia, the Pacific Basin, parts of the Middle East and the Amazon Basin (23) . WHO estimates that prevalence of HCV in African is 5.3%, it is markedly higher in some areas, particularly Egypt 17.5%. In Kenya and Ethiopia it is estimated that more than 60% of chronic liver disease and up to 80% of hepatocellular cancers are due to chronic hepatitis B and C viral infections. In Ethiopia, the prevalence of HBV is nearly 10%–15% and that of HCV is nearly 2%–5% (24).

The risk of exposure to sexually transmitted diseases (STDs) in Military personnel is 2 to 5 times higher when compared with civilian populations (25). Risky sexual behaviors such as sexual intercourse with prostitutes, sex with multiple partners, sex with a partner who has multiple sex partners, sex with partners likely to be STD's carriers, unprotected sex are among a significant risk factors that expose to STD's infections, inside and outside the military environment (26). As well, multiple partnering is identified to be among the risky behaviors engaged in by armed forces bases on survey conducted in the Nigerian (27).

Different studies on the prevalence of HBV and HCV have been conducted in different parts of Ethiopia, most of them focused on investigating the prevalence among blood donors (28, 29), HIV infected individuals (30, 31) and medical waste handlers (2). There is no data reported about the magnitude of HBV and HCV prevalence and associated risk factors among military groups in the Amhara National state in particular or the country at large among military personnel. Thus, the aim of this study was to determine the prevalence and associated risk factors HBV and HCV infection among military personnel attending medical services at Bahir Dar armed forces of general Hospital, Northwest Ethiopia.

2. Literature review

The prevalence of both HBV and HCV infection were reported among the different members of the community in different countries. Because both of these viruses are transfusion transmissible infections (TTIs), screening blood donors for these viruses is the daily practice of many blood banks all over the world. The majority of the study results reveled higher prevalence of both HBV and HCV infection among peoples living in congregate settings such as the prisons compared to the general population. Moreover, some study reports conducted on military personnel also showed significantly higher prevalence of HBV and HCV infection compared with the general population. For example, Nokhodian et al reported a 12.9% and 7.4% HBV and HCV prevalence respectively among female prisoners in Iran (32). Another study also conducted in Iran among 881prisoners showed a 6.9% and 7.7% prevalence of HBV and HCV infection respectively. Drug abuse and history of traditional phlebotomy were associated risk factors for HBV and history of drug injection was associated with HCV infection for these study groups (33). On the other hand, reported a 23% and 12% HBV and HCV prevalence among prisoners in Nigeria but only 0.07% were co-infected with both HBV and HCV (34) . A cross sectional study conducted in Sudan showed 8.2% HBV infection among healthy people visited Kassala teaching hospital (35). A study conducted in Wolidia, Ethiopia among 270 prison inmates, 10.4% a prevalence rate of HBV infection was reported. In this study dental extraction were the major risk factors (36).

There are also study reports that determined the prevalence of these viruses infection among HIV positive individuals. For instance, a cohort study conducted in Nigeria showed that 11.9% HBV and 4.8% HCV co-infection among HIV infected patients (37). In the same country, another study reported that dual infection by HBV and HCV was found 3.9% but the prevalence of HBV and HCV infection among 102 HIV infected patients were 28.4% and 14.7% respectively. The study also determined the prevalence of both HBV and HCV prevalence among apparently healthy people as control and found much lower prevalence, 6.0% for HBV and 0.8% for HCV (38). Another study conducted in Kenya, Nairobi among 378 HIV positive individuals showed a 6% and 1% prevalence of HBV and HCV infection respectively (39). The study conducted in Florida in the sexual transmitted infection clinic showed the prevalence of HCV infection was 4.7% by the year of 2000. Body tattooing, receiving a blood transfusion , family contact with HCV infected person and having inject drug use were observed at risk factors with anti-HCV (40).

Similar study conducted in Addis Ababa, Ethiopia among HIV positive and HIV negative inhabitants reported that the prevalence of HCV infection was higher among HIV positives 4.5% compared with HIV negative patients 0.8% (30). Another study conducted felgehiwot referral hospital showed that the prevalence of HBsAg and anti-HCV antibody were 2.0% and 5.5%, respectively among HIV positive children (41). In 2012, a cross sectional study conducted in Debretabor hospital showed that the prevalence of HBsAg was 6.1% and that of anti-HCV antibody was 1.3% among a total of 395 HIV infected individuals (42). In Gondar, the prevalence of HBV and HCV showed that 5.6% and 5.0% respectively but only 1.1% were co-infected with both HBV and HCV among HIV positive individuals (31).

Both HBV and HCV are transfusion transmissible infections (TTIs) and because of that many of the blood banks all over the world screen blood donors for HBV, HCV, HIV and other TTIs. The magnitude of HBV and HCV among apparently healthy blood donors varies from country to country. Recently, Baha et al reported a prevalence of 1.8% and 1.58% for HBV and HCV respectively in the general population and 0.96% HBV with 0.62% HCV prevalence among blood donors in Morocco. In this study dental procedure history ,history of jaundice and history of sexual behaviors were observed at major risk factors of HBsAg and surgical history were observed anti-HCV among the general population (43). In Jordan, the prevalence of HBV and HCV infection among blood donors was reported 1.4% and 0.8% respectively. In this study the age was strongly associated with HBV and HCV infection (44). Another study conducted in west Bengal, eastern India by the year 2005 reported prevalence 1660 per 100,000 for HBV and 350 per 100,000 for HCV (45). In the same country, study conducted in Ganesh Shankar Vidyarthi Memorial (GSVM) Medical College, Kanpur, India, 20,000 healthy blood donors who were HBsAg status using ELISA kit show that the prevalence was 2.25% from March 2002 to June 2006 (46). On the other hand, Khan et al documented a relatively higher prevalence of HCV infection 3.13% among voluntary blood donors in Pakistan (47). In the same country, Pakistan, another study conducted from years 2005 to 2008 reported prevalence 2.07% HBV and 0.89 HCV among 3915 blood donors (48). A community based cross sectional study conducted in Egypt on 1000 apparently healthy blood donors revealed a 5% prevalence of HBV infection. The dental extraction and tattoo were observed at risk factors HBsAg (49).

There are also reports that showed the prevalence of both HBV and HCV among blood donors recruited for blood donation in different blood banks of Ethiopia. A study done in Amhara and

Tigray regional state showed that the of prevalence of HBV and HCV was 6.2% and 1.7% respectively among blood donors (28).

In Gondar, a study showed that a 6% and 1% prevalence of HBV and HCV respectively among medical waste handlers and non clinical waste handler prevalence of 1% HBV and 0% HCV (2). The prevalence of HBV and HCV infection was reported 4.7% and 0.7% respectively among apparently healthy blood donors in University of Gondar hospital (29). In the same country another study conducted among street dweller reported for the prevalence of HBsAg was 10.9%. Sero positivity HBV infection was higher in females 28.9% than in males 8.3%. In this study showed that age of street dweller were found to be a significantly associated HBV infection (50).

The prevalence of HBV and HCV infection among military groups was investigated in different countries previously. For instance, In India armed forces reported a 7.9% overall prevalence of HBV infection and sero-prevalence of HBV infection was significantly associated with history of sexual intercourse with commercial sex workers (51). A cross sectional study conducted in Afghan National Army recruits at the Kabul Military Training Center prevalence of anti- HCV showed that 0.82% between February 2010 and January 2011(52). In a hospital based study conducted in Pakistan among military personal 47% of the patients were infected with chronic HCV infection (53). Another study conducted in the same country, Pakistan, in two military hospitals showed a 2.9% and 1.7% prevalence of HBV and HCV infection respectively (54). A cross-sectional study conducted in Senegal, the overall prevalence of HBsAg was 10.8% among 1224 Senegal military (55). A study was done military recruits in Greece the overall prevalence of HBsAg showed that 0.32% among 1,840 participants from 2004 -2005 (56). A study conducted in Turkey showed that 2.8% overall prevalence HBV infection among new recruits in a military unit and sero prevalence HBV infection was significantly associated having a history of living with a hepatitis B carrier and presence of a hepatitis B carrier in the neighborhood or at work (57) .

3. Significance of the study

The risk of acquiring both HBV and HCV among military personnel is reported higher in different countries. Living in military camps in particular and other congregate settings in general contribute for being at a greater risk for HBV and HCV infection. Peoples suffering from repeated injury and admitted to hospitals could be also at higher risk to be infected by these viruses. Certain aspects of military services such as an exposure to blood during combat, sexual contacts and tattoos increase the risk of HBV and HCV infection. Both HBV and HCV can be transmitted through unprotected sexual intercourse and military peoples living in military campus are at higher risk to meet commercial sex workers and acquire HBV and HCV. Another risk factor could be the displacement of military personnel from place to place. Military's by nature travel from place to place for different reasons and meet different members of the migration society. This will force the soldieries to meet another sex partner probably commercial sex worker and will be exposed for sexually transmitted infections (STIs) in general and infection by HBV and HCV in particular.

However, both HBV and HCV risk factors and the magnitude of the problem are not well studied in Ethiopia among military personnel and also no reports was done in Amhara national state particularly in Bahir Dar armed forces of general Hospital. Thus, the aim of this study is to determine the prevalence and associated factors of HBV and HCV infection among military personnel. Understanding the magnitude of these viruses among military personal possibly deliver different relevance. First, it can be used to control theses viruses among people living in congregate settings such as military camps and secondly the magnitude of these viruses could also help in tracing the prevalence of HIV and other STIs which was valuable to design strategies to control the transmission among military people and the general population. The study also serves as a baseline information and comparative data for similar future studies.

4. Objective

4.1. General objective

The overall aim of this study was to determine the prevalence of hepatitis B and hepatitis C viruses infection and associated risk factors among military personnel attended at Bahir Dar armed forces general hospital.

4.2. Specific objectives

1. To determine the prevalence of hepatitis B virus infection among military personnel.
2. To determine the prevalence of hepatitis C virus infection among military personnel.
3. To identify the risk factors that contributes HBV and HCV infection among military personnel.

5. Materials and method

5.1. Study area

The study was conducted at Bahir Dar armed forces general hospital found in Bahir Dar town. The town is located in the North West part of Ethiopia and it is the capital city of the Amhara national state. The city is located approximately 578 km (360 miles) to the North-west of Addis Ababa, and has an elevation of 1,840 meters (6,036 foot) above sea level. According to the statistical agency of the town, Bahir Dar Special Zone has a total population of 221,991, of whom 108,456 are men and 113,535 women; 180,174 or 81.16% are urban inhabitants, the rest of population are living at rural kebeles around Bahir Dar.

Bahir Dar armed forces general hospital is found in the Ethiopian ministry of national defense of western commend. It is far from approximately 10 kilo meters in the town. Bahir Dar armed forces general hospital is currently provides health service to more than 9,000 military and military families per year in the surrounding area of the town and adjacent regions. It has 9 departments with 200 beds for inpatient service at 5 wards: medical, surgical, Special, ICU (intensive care unit) and gynecology /obstetrics. The hospital also provides outpatient services including emergency and normal OPD.

5.2. Study design and period

Institution based cross sectional study was conducted at Bahir Dar armed forces general hospital from the 1st of February 2015 to the 15th of May 2015.

5.3. Source population

The source population was all military patients attending Bahir Dar armed forces general hospital.

5.4. Study population

The study population was military patients seeking health service at the outpatient department (OPD) of the hospital during the study period.

5.5. Inclusion criteria

Military personnel seeking health service at the OPD of Bahir Dar armed forces of general hospital and can give informed consent and enough amount of blood was included in the study.

5.6. Exclusion criteria

Military personnel who have previously known positive HBV and HCV viruses were excluded from the study.

5.7. Variables

5.7.1. Dependent variables

Prevalence HBV and HCV

5.7.2. Independent variables

Age, sex, marital status, work experience, history of hospitalization, history of having received blood transfusion, history of surgical procedure, ear/nose piercing, dental extraction, tattooing, history of multiple sexual partner, Family history of liver disease, Sharing of shaving blade or nail cutter with others, history of jaundice or liver disease, history of sexual transmitted disease and ever had war related injury.

5.8. Sample size and sampling technique

5.8.1. Sample size determination

Due to lack of previous studies showing the prevalence of HBV and HCV among Military personnel neither in Bahir Dar nor in any parts of the nation Ethiopia, sample size was determined for this particular study using a 50% prevalence of both HBV and HCV infection. The sample size was determined using single population proportion formula as follows:

$ni = z^2_{\alpha/2}\, p\,(1-p)/\, d^2$; Where ni= Initial sample size; Z=95% confidence interval; α = the level of significance which can be obtained as 1- confidence level; d= Margin of error between the sample and the population (d=5%), and P (prevalence) = 50%.

Accordingly, $ni= (1.96)^2 x\ 0.5(1-0.5) = 384$

$(0.\ 05)^2$

Considering a 5% non response rate the final sample size was computed as 403.

5.8.2. Sampling technique

Systematic random sampling technique was used. The number of study participants included was out of total military personnel who attended OPD. On average, about 22 military personnel per day who sought treatment attended OPD at Bahir Dar armed forces general hospital. Considering three months of period, 1320 military personnel were expected to attend the OPD during the study period. The number of three month military personnel divided by the number of study participant 1320/403= 3, so sampling interval is 3. From the first three participants, one was be randomly selected by lottery method, and then every 3rd individuals who attended the OPD was selected to participate in the study.

5.9. Operational defination

Military: are forces authorized to use lethal force, and weapons, to support the interests of the state and some or all of its citizens.

5.10. Data collection and process

5.10.1. Socio demographic data and other risk factors

Socio demographic characteristics and associated risk factors of HBV and HCV were collected using structured and pre test questioner face to face interview by trained health officers. The questionnaire was developed in English and then translated in to Amharic (local language) then to English. The collected data was checked for its completeness and validity to get a reliable and clear data (Annex III).

5.10.2. Blood specimen collection and processing

Blood sample was collected by trained laboratory technologist, three milliliters (3ml) of venous blood was collected from each study participants. The blood was collected in to sterile plain tubes by strictly following standard operational procedures. Then the sample tube was labeled with the subject's code number and the blood specimen was allowed to stand at room temperature until completely clotted. Serum was separated from the clot by centrifugation at 3000 revelation per minute (rpm) for 5 minutes for checking the presence of HBsAg and anti-HCV antibody. The sera were then frozen at -20 ^{0}c until testing. The sera were kept at room temperature and screened for HBsAg using commercially available test kit according to the manufacturer's instruction which works based on principle of immunechromatographic assay

(One step HBsAg test, Shanghai Eugene Biotech co.,Ltd) which has 96.2% sensitive and a specificity of 99.3% (Annex V).

Similarly, sera were screened for anti HCV antibody using rapid test kit which works based on principle of immunechromatographic assay (Eugene one step hepatitis C virus test, Shanghai Eugene Biotech co., Ltd) which has 98.13% sensitivity and 99% specificity (Annex V).

5.10.3. Quality control

Before using the prepared questionnaire for collection of information, it was checked for its completeness and validity to get a reliable and clear data. To ensure the quality of the data the pre- test was conducted among military attending OPD at 24 th military hospital level two at Azezo, Gondar on 5% of sample size. Two days training was given for data collectors on procedures, techniques, and ways of expressing the questionnaires to collect the necessary information. Every day, the collected data was reviewed and cheeked for completeness by principal investigator. For laboratory investigations standardized operating procedures and manufacturer's instructions followed strictly. Known positive and negative samples were run to assess the performance of the test kits prior beginning laboratory investigations.

5.11. Data analysis and interpretation

Data was entered and analyzed using statistical package for social sciences (SPSS) version 20 computer software. Descriptive statistics were used to analyze socio- demographic characteristics, prevalence of HBsAg and anti - HCV. The result of the study was summarized using tables, graphs and texts. Association between each exposure and sero positivity of HBV and HCV infection were determined by using bivariate analysis. Those variables with overall P value less than 0.2 in the bivariate analysis were entered in to multivariable model. Odds ratio was used to measure the strength of an association. Variables having P-value < 0.05 was considered statistically significant.

5.12. Ethical consideration

The study was conducted after getting ethical approval from the ethical committee of School of Biomedical and Laboratory Sciences, College of Medicine and Health Sciences, University of Gondar, Department of Medical Microbiology. Bahir Dar armed forces general hospital had communicated through written paper obtained from College of Medicine and Health Sciences,

University of Gondar and permission was obtained from the administrator of the hospital. The study participants were informed about the objectives of the study and written informed consent was obtained from each participants. They were also told that they have the right not to participate in the study. In addition they were also told that the study did not have any phisical harm except the minimal risk associated with blood drawing. Only voluntary participants were recruited. They were also informed that all the information and results of their sample was kept confidential by using codes instead of any personal identities. The results were notified to study participants. Individuals found to be HBV or HCV were linked to OPD physician and nurses for further monitoring and management.

5.13. Dissemination of the result

The result of the current study will be submitted to University of Gondar, College of Medicine and Health Sciences, School of Biomedical and Laboratory science, Department of Medical Microbiology, The Amhara National state Health bureau and Bahir Dar Military hospital. The result of this research will be also published on reputable journals which will disseminate the existing condition concerning undiagnosed hepatitis B and C virus infection among military personnel seeking health service at Bhair Dar armed forces general hospital.

6. Results

6.1. Socio-demographic characteristics

A total of 403 individuals were enrolled being 362 (89.8%) males with the mean age of 32.6 ± 7 years. Two-hundred fifteen (53.4%) clients were married, 178 (44.2%) single and 9 (2.2%) divorced. Data on educational status 194 (48.2%) accomplished the college or higher education and the other 183 (45.4%) had high school education. Three-hundred nineteen (79%) were residents of urban but the other 85 (22%) were living in rural areas. Majority of the study participants were orthodox followers in religion 325 (80.6%) (Table1).

Table 1Socio-demographic characteristics of military personnel at Bahir Dar armed forces of general hospital, February – May, 2015(n=403)

Variable		Frequency	
		Number	Percent
Sex	Female	41	10.2
	Male	362	89.8
Age	20-29	160	39.7
	30-39	172	42.7
	40-49	69	17.1
	> 50	2	0.5
Work experience(year)	< 10	179	44.4
	10 – 20	184	45.6
	>20	41	10.1
Current residence	Urban	319	79.2
	Rural	85	21.9
Educational status	Elementary	26	6.4
	High school	183	45.4
	College and above	194	48.2
Religion	Orthodox	325	80.6
	Muslim	42	10.4
	Others	36	9
Marital status	Single	178	44.2
	Married	215	53.4
	Widowed	1	0.2
	Divorced	9	2.2

6.2. History of exposures to different risk factors of HBV and HCV

History of hospitalization and dental extraction were the most frequently reported exposures which account 135 (33.5%) and 116 (28.8%) respectively. Three hundred ninety two (97.3 %) of them reported no history of blood transfusion and the remaining 11 (2.7 %) participants had received blood transfusion. Concerning the history of surgery; 39 (9.7%) had surgical history and the rest i.e. 364 (90.3%) no history of surgical operation. Ninety-one (22.6 %) of the military personnel have no sexual partner, 298 (74 %) have one sexual partner and the remaining 14 (3.4%) have multiple (above two) sexual partners. The assessment data on the history of liver disease within the family of the military personnel's showed that the majority 385 (95.8%) had no any family history of liver disease and the rest 17 (4.2 %) had family history of liver disease. The result of this study showed that 5 % of the participants had history of sexual transmitted infection and 15.4% history of ear piercing (Table 2).

Table 2. History of exposures for HBV and HCV among military at Bahir Dar armed forces of general hospital, February – May, 2015 (n=403).

Variable		Frequency	
		Number	Percent
History of hospitalization	Yes	135	33.5
	No	268	66.5
History of body tattooing	Yes	69	17.1%
	No	334	82.9
History of dental extraction	Yes	116	28.8
	No	287	71.2
History of received blood transfusion	Yes	11	2.7
	No	392	97.3
Surgical history	Yes	39	9.7
	No	363	90.3
Number of sexual partner	No	91	22.6
	One	298	74
	Two and above	14	3.5
Family history of liver disease	Yes	17	4.2
	No	385	95.8
History of liver disease	Yes	12	3
	No	391	97
Sharing of shaving blade or nail cutter	Yes	23	5.7
	No	380	94.3
Ear piercing	Yes	62	15.4
	No	341	84.6
Nose piercing	Yes	10	2.5
	No	392	97.5
Circumcision (for only males)	Yes	343	94.8
	No	19	5.2
History of sexual transmitted infection	Yes	20	5
	No	383	95.1
War related injury	Yes	62	15.4
	No	341	84.6

6.3. Sero-prevalence of HBV and HCV

Among the 403 military personnel participated in the current study 4.2% (17/403) was positive for HBsAg but only 0.2% (1/403) person was positive for anti-HCV antibody. The overall viral hepatitis caused by HBV and HCV was found 4.5% (18/403). In this study the point prevalence of HBV infection was 318.2/100,000 and that of HCV 15.2/100,000. However, none of the military personnel was infected by both HBV and HCV.

6.4. Hepatitis B virus and hepatitis C virus infection in relation socio-demographic characteristics

The highest prevalence of HBsAg 11.2 % (8/71) was observed among military personals with the age of 40 and above followed by the age group between 30 to 39 years of age 3.5% (6/172). Relatively higher prevalence of HBV infection was observed among Rural dweller 5/84 (6 %). Hepatitis B virus prevalence was higher among married personnel's 12/215 (5.6 %) than single military personnel's 5/178 (2.8%) and military personnel's who attended for high school education showed a relatively higher prevalence of HBV infection 6% (11/183) than military personals attended elementary school or college education. The prevalence of HBV infection 5.46 % (10/183) was higher among military personnel that served for 10 – 20 years within the military group than those that served less than 10 years (Table 3).

Table 3. Demographic characteristics of military personnel and prevalence of HBV and HCV at Bahir Dar armed force general hospital, February – May, 2015 (n=403)

Variable		Total (n %)	HBV		HCV	
			Positive n (%)	Negative n (%)	Positive n(%)	Negative n (%)
Sex	Female	41(10.2)	2 (4.9)	39 (95.1)	0	41(100)
	Male	362 (89.8)	15 (4.2)	347 (95.8)	1(0.27)	361 (99.7)
Age (year)	20 -29	160 (39.7)	3 (1.87)	157 (98.1)	0	160 (100)
	30 -39	172 (42.7)	6 (3.5)	166 (96.5)	0	172 (100)
	40+	71 (17.6)	8 (11.2)	63 (88.7)	1(1.4)	70 (98.5)
Residence	Urban	319 (79.1)	12 (3.8)	307 (96.2)	1(0.3)	318 (99.7)
	Rural	84 (20.8)	5 (5.9)	79 (94)	0	84 (100)
Educational status	Elementary	26(6.5)	0	26 (100)	0	26 (100)
	High school	183 (45.4)	11(6)	172 (93.9)	1(0.54)	182 (99.4)
	Collage and above	194 (48.1)	6 (3.09)	188 (96.9)	0	194 (100)
Religion	Orthodox	325 (80.6)	14 (4.3)	311(95.6)	1(0.3)	324 (99.6)
	Muslim	42 (10.4)	2 (4.7)	40 (95.2)	0	42 (100)
	Others	36 (8.9)	1(2.7)	35 (97.2)	0	36 (100)
marital status	Single	178 (44.2)	5(2.8)	173 (97.1)	0	178 (100)
	Married	215(53.34)	12(5.6)	203 (50.3)	1 (0.46)	214 (99.5)
	Widowed	2 (0.49)	0	2 (100)	0	2 (100)
	Divorced	8 (1.98)	0	8 (100)	0	8 (100)
work experience(year)	<10	179 (44.4)	5(2.79)	174 (97.2)	0	179 (100)
	10 -20	183 (45.4)	10 (5.46)	173 (94.5)	1(0.5)	182 (99.4)
	>20	41(10.1)	2 (4.87)	39 (95.1)	0	41 (100)

6.5. Association between risk factors for viral hepatitis (HBV and HCV) infection among military personnel at Bahir Dar armed general hospital

In bivariate logistic regression analysis risk factors such as history of hospitalization, tattooing, dental extraction, family history of liver disease, ear piercing, war related injury, history of blood transfusion, number of sexual partners, history of jaundice and sharing of shaving blade or nail cutter were not significantly associated with infection caused by the hepatitis viruses. However, demographic variable such as age (p= 0.003; COR 7.59; 95% CI 1.991, 28.992) and risk factors such as nose piercing (COA 5.85; 95% CI 1.153, 29.93, p=0.033) and sexual transmitted infections COR 4.33; 95% CI 1.143, 16.39, p=0.031) were significantly associated with infection caused by the hepatitis viruses.

For the multivariate regression analysis, all covariates that had P-value of ≤ 0.2 and variables that had significant association with the hepatitis viruses' infection during the bivariate analysis were attempted. The backward stepwise regression which controls the problem of confounding was employed and only STI contributing factor remained to be significantly associated with viral hepatitis (HBV and /or HCV) infection ($P \leq 0.05$). Moreover, military personals that had history of STIs were found 5 times at a higher risk to be infected by hepatitis viruses (HBV / or HCV) than compared with military personnel that had no history of STIs (P value =0.019; AOR 5.126; CI 95% 1.306, 20.126) (Table -4).

Table 4. Bivariate and multivariate analysis of risk factors association with hepatitis virus infection.

Variable		Viral hepatitis		COR (95% CI)	P-Value	AOR (95% CI)	P-Value
		Positive N(%)	Negative N(%)				
Sex	Female	2	39	1:00			
	Male	16	346	0.902 (0.200,4.069)	0.89		
Age	20-29	3	157	1:00			
	30-39	6	166	1.89 (0.465,7.694)			
	40+	9	63	7.59 (1.991,28.992)	**0.003**		
Current residence	Urban	13	306	1:00			
	Rural	5	79	1.490 (0.516,4.303)	0.461		
Educational status	Up to 12	12	197	1:00			
	College & above	6	188	0.524 (0.193,1.424)	0.205		
Religion	Orthodox	15	310	1:00			
	Muslim+ others	3	75	.827(0.233,2.929)	0.768		
Marital status	Single	5	173	1:00			
	Married	13	202	2.355 (0.824,6.735)	**0.11**		
Work experience	<10	5	173	1:00			
	10-20	11	173	2.20 (0.749, 6.46)	**0.152**		
	>20	2	39	1.77 (0.332, 9.485)	0.503		
Hospitalization	No	11	257	1:00			
	Yes	7	128	1.278 (0.484,3.374)	0.621		
Tattooing	No	13	321	1:00			
	Yes	5	64	1.929 (0.665,5.600)	0.227		
Dental extraction	No	11	276	1:00			
	Yes	7	109	1.611(0.609,4.264)	0.337		
Surgical history	No	14	350	1:00			
	Yes	4	35	2.857(0.892,9.153)	**0.077**		
Number of sexual partner	0	2	89	1			
	1	14	284	2.19(0.489, 9.837)	0 .305		
	≥2	2	12	7.41(0 .954, 57.64)	**0 .055**		
Family history of liver disease	No	16	369	1:00			
	Yes	2	16	2.88(0.610,13.621)	**0.181**		
Ear piercing	No	15	326	1:00			
	Yes	3	59	0.905(.254,3.223)	0.877		
Nose piercing	No	16	376	1:00			
	Yes	2	8	5.85 (1.153, 29.93)	**0.033**		
STI	No	15	368	1:00		1	
	Yes	3	17	4.33 (1.143,16.39)	**0.031**	5.126(1.306,20.126)	**0.019**
War related injury	No	15	326	1:00			
	Yes	3	59	0.905 (.254,3.223)	0.877		

COR – Crude odds ratio, CI – Confidence interval, STI – Sexual transmitted infection, AOR –Adjusted odds ratio, 0 = no sexual partner, 1= one sexual partner, ≥ 2= sexual partner two and above

7. Discussion

Both hepatitis B and C are common infections affecting masses and are the leading causes of chronic liver disease. Hepatitis is an inflammation of the liver, most commonly caused by a viral infection. Hepatitis B virus (HBV) and hepatitis C virus (HCV) infections account for a substantial proportion of liver diseases worldwide. These viruses are responsible for liver damages ranging from minor disorders to liver cirrhosis and hepatocellular carcinoma (HCC). However, data regarding HBV and HCV viruses' prevalence among military personnel in the Amhara National state is lacking.

The result of the present study showed that the prevalence of hepatitis B virus infection was 4.2%. A recent study in Gondar, Ethiopia showed a prevalence of 1 % for HBV infection in the non clinical waste handler without any risk for infection (2). This prevalence difference between the military groups and other members of the population in the same administrative region may demonstrate that the military groups are at relatively higher risk for hepatitis B virus infection. The prevalence of HBV infection (4.2%) among Military groups found in Bahir Dar armed forces general Hospital was nearly similar to the prevalence of HBV prevalence reported from apparently healthy blood donors in Gondar (4.7%) (29) . However, the prevalence of HBV found in the current study was lower than the prevalence reported from Gondar town street dwellers (10.9%) (50). Previously, Higher prevalence of HBV infection (10.4%) was also reported in Woldia from prisoners (36). Another Higher prevalence of HBV infection was also reported in some African countries among different population groups. For example, a prevalence of 8.2% was reported in Sudan among healthy people (35), 23% in Nigeria among prisoners (34) and 11.9% among HIV positive patients in Nigeria (37).

The prevalence of HBV infection among military groups was also reported higher in some African and Asian countries. In India and Senegal the prevalence of HBV infection among military groups was reported 7.9% and 10.8% respectively (51, 55). The discrepancy might be due to the differences in diagnostic methods. In-contrast, the prevalence HBV infection in this study is relatively higher than a previous study done in Pakistan 2.9 % (54), in Greece 0.32% (56) and in Turkey 2.8 % (57) among military groups.

The prevalence of HBV and HCV infection found in the current study can be graded intermediate and low according to WHO criteria (10) .The prevalence of HBV infection can be graded high when the prevalence is > 8%, intermediate when the prevalence is between 2-8% and low when < 2% (58). Hepatitis C virus infection can be also graded high, moderate or low when the prevalence is >3.5%, 1.5%-3.5% and <1.5% respectively (59) .

In the current study, the prevalence of HCV infection was found 0.2%. This prevalence is nearly similar to previous reports among medical waste handler 1% and prevalence reported among blood donors (0.7%) in Gondar (2, 29) . More over this finding is in agreement with the prevalence of HCV infection was reported 0.8% in Nigeria among apparently health people, 0.62% in Morocco, 0.8% in Jordan, 0.89% in Pakistan among blood donors (38, 43, 44, 48). The present study also similar with 0.82 % prevalence of HCV among military groups in Kabul military Training Center (52).

On the other hand, relatively higher prevalence of HCV infection 1.7% was reported in Pakistan among military groups (54). The difference might be due to the presence of high risk groups such as intravenous drug users as well as difference including the use of more reliable diagnostic methods to detect HCV infection in those countries.

The proportion of HBV infection was higher among military personals with the age of 40 and above 11.2% (8/71) followed by the age group between 30 to 39 years of age 3.5% (6/172). In a study conducted in China investigated the clinical and virological characteristics of HBV in chronic HBV infected patients of different ages and reported significantly different HBV clinical and virological characteristics in patients with chronic HBV infection of different ages. Among patients below 20 years of age immune tolerance accounted for 86.05% and among patients in the above 40 age group, there were markedly more reactivation cases than in any other group (60). Moreover, it was also observed that by the age of 40 years, 87% of the Nigerian population has at least one HBV serologic marker (61).

In the current study relatively higher prevalence of HBV infection was observed among rural dweller 6 % (5/84). This may suggest that horizontal transmission aided by cultural or behavioral factors and clustering of carriers could be the main determinant of HBV prevalence in among the rural dweller military groups investigated military at Bahir Dar armed forces of general hospital. The prevalence of HBV was higher among married military

personnel's (5.6 %) than single military (2.8%). One possible reason for this could be displacement of military from the residence where their family was living as military are movable and standby which may force them for multiple sexual practices. However, there are reports that showed marital status did not affect the carriage of HBsAg (55) .

However, multivariate linear regression analysis of risk factors such as history of hospitalization, tattooing, dental extraction, ear piercing, war related injury, and sharing of shaving blade or nail cutter were not significantly associated with infection caused by the hepatitis viruses. Contrary to these findings, a study conducted in Bahir Dar showed that significant association between history of blood transfusion, body tattooing, previous history of surgery and unsafe injection to HBV infections among pregnant women (62). A similar study, which was conducted in Egypt identified these variable as significant risk factors for HBV infection (63). Study participants who have body tattooing on any part of their body was also 5.7 times more likely to be HBsAg positive. Studies conducted from Bamako, Mali identified that body tattooing has a significant association with HBV infection (64).

Risk factors such as previous exposure to STI showed significant association with hepatitis B virus infection. There are some evidences demonstrate that military groups are at a higher risk of acquiring hepatitis causing viruses compared with that of the general population. For that matter, soldiers are considered as a gateway group for sexually transmitted diseases (STIs) (55).

Although only one soldier was positive for HCV infection in the present study, this client was negative for HBV. Several reports indicated that co-infection with both HBV and HCV is uncommon. In a study conducted among blood donors in the Amhara and Tigray national state there was no HBV and HCV co-infection found (28). By another study report from Nigeria among prisoners only 0.07% were co-infected with both HBV and HCV (34). Therefore, HCV infection is uncommon among HBV positive patients and some authors describe mutual inhibition (65) .

8. Limitation of the study

- Due to the limited resources, only rapid test kits were used for detection of HBsAg and anti- HCV antibody. Confirmatory tests like ELISA were not possible to use in this study
- Since this study was hospital based study, it may not reflect the actual prevalence among the general military in the area.

9. Conclusion and recommendation

9.1. Conclusion

The prevalence of HBV and HCV infections among military personnel at Bahir Dar armed forces general hospital can be graded as intermediate and low respectively. Moreover, there was statistically significant association between previous history of STIs and to that of the HBV infection.

9. 2. Recommendations

The intermediate prevalence of HBV infection among military groups dictates to formulate appropriate preventive method. Screening for HBV infection among known sexual partners could be one possible strategy for regular check up. Vaccination against HBV might be required to control the transmission of HBV from the military group to the community. Further studies needs to be carried out in the area with relatively improved study designs and diagnostic methods to know the true burden of HBV and HCV infections in military personnel.

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11. Annexes

Annex I. English version information sheet and consent form

Information sheet

Study title: The sero - prevalence of HBV and HCV infection and associated risk factors among military personnel at Bahir Dar armed forces general hospital, Northwest Ethiopia.

Name of investigator: Tigist Birku
Name the organization: University of Gondar College of Medicine and health sciences school of biomedical and Laboratory sciences.

Name of the sponsor: Amhara Regional State Health Bureau.

Purpose of the study: HBV and HCV infections are major health problems. So that I am to conducts a study with objective of investigate prevalence of HBV and HCV infection in military patients attending military service hospital. The knowledge gained from this study is believed to help the management and control of these viruses.

Participation

I am asking to voluntarily participate in this study. What is expected from everyone is to be examined for HBV and HCV and be asked to answer few questions in relation to risk factors. The laboratory examination involves collection of 5 ml venous blood. All samples are collected using sterile and disposable equipments: tubes, syringes and needles.

Risk and discomfort associated

By participating in this study you may feel that it has some risk or discomfort by taking 5ml of blood but doesn't have any harm to your health except minor needle brick injury pain which lasts only for micro second.

Benefits

If there is any positive finding in laboratory investigation the result will be communicated to your physician and prescription of treatment and advice will be effected.

Confidentiality

Any information that is obtained in connection with this study and that can be identified with you will remain confidential. The information collected about you will be coded using numbers.

Sharing the result

At the end of this study we write a report about the results of the study through publication or any other means. The reports won't bear any information relevant to your personality e.g. your name or identity. We assure you the confidentiality of such information. Thus we also need your permission to use the test results for writing a report.

Participation and withdrawal

You can choose whether to be part of the study or not. You may withdraw at any time without consequences of any kind. You may also refuse to give any sample and/or information.

Contact Address

If you have any further question and in case of urgency you can contact the principal investigator at any time using the following address:-

Name:- Tigist birku (Principal investigator)
Address: - University of Gondar College of Medicine and Health Sciences
School of Biomedical and Laboratory Science
City: - Gondar
Mobile No. : +251918414446
Email:- tigib41@gmail.com

Consent form

I, the undersigned individual have been well informed about the objectives of the study as described below.

Dear respondent my name is Tigist birku .The aim of the study is to assesses hepatitis B and hepatitis C virus infection and risk factors among military. Your response helps us to find out risk factors associated with hepatitis B and C virus infection so that the possible solution will be given by the responsible bodies. For the research we need your response for questions and blood sample to detect HBV and HCV. For any question you can ask the principal investigator .you have the right to not to participate or withdraw. All the information you will give us will be used for research purposes and kept confidential.

Name …….

Signature……

ANNEX II. Amharic Version Study Participant Information and Consent Form

ለጥናቱ መረጃ ና ተሳታፊነት መግለጫ ቅጽ

የ ጥ ና ቱ መ ረ ጃ

የ ጥ ና ቱ ር ዕ ስ

የ ሂ ፓ ታ ይ ት ስ ቢ እ ና ሲ ቫ ይ ረ ስ በ ባ ህ ር ዳ ር በ ሚ ኝ ው በ ወ ታ ደ ሮ ች ሆ ስ ፒ ታ ል ወ ስ ጥ በ ሜ ዝ ከ ም ወ ታ ደ ሮ ች ላ ይ ያ ለ ው ን ስ ር ጭ ት ና አ ጋ ላ ጭ መ ን ስ ኤ ዎ ች ን ማ ወ ቅ ::

የ አ ጥ ኚ ው ስ ም: ት ዕ ግ ስ ት ብ ር ቁ

የ ሚ ያ ጠ ና ው ድ ር ጅ ት ስ ም :- ጎ ን ደ ር ዩ ኒ ቨ ር ሲ ቲ ህ ክ ም ና ና ጠ ፍ ሳ ይ ን ስ ኮ ሌ ጅ ባ ዮ ሜ ዲ ካ ል ና ላ ብ ራ ቶ ሪ ሳ ይ ን ስ ት ም ህ ር ት ክ ፍ ል

የ ጥ ና ቱ ን ው ጭ የ ሚ ሸ ፍ ነ ው ን ድ ር ጅ ት ስ ም :- የ አ ሚ ራ ክ ል ል ጠ ፍ ቢ ሮ

የ ጥ ና ቱ አ ላ ማ :- የ ሄ ፓ ታ ይ ት ስ B እ ና ሲ ቫ ይ ረ ሶ ች በ ህ ሙ ማ ን በ ወ ታ ደ ሮ ች ያ ለ ው ን ስ ር ጭ ት ለ ማ ጥ ና ት የ ታ ቀ ደ ነ ው ::

በ ጥ ና ቱ ስ ለ መ ሳ ተ ፍ

በ ዚ ህ ጥ ና ት መ ሳ ተ ፍ በ መ ሉ ፈ ቃ ደ ኝ ነ ት ላ ይ የ ተ መ ሳ ረ ተ ነ ው:: ስ ለ ሆ ነ ም በ ጥ ና ቱ እ ን ዲ ሳ ተ ፉ ፈ ቃ ደ ኛ ነ ት ዎ ን እ ን ጠ ይ ቃ ለ ን :: ለ መ ሳ ተ ፍ ከ ፈ ቀ ዱ 3 ሚ ሊ ሊ ት ር የ ደ ም ና ሙ ና ከ ክ ን ድ ዎ ተ ወ ስ ዶ የ ላ ቦ ራ ቶ ሪ ም ር መ ራ ይ ደ ረ ግ ሎ ታ ል :: የ ላ ቦ ራ ቶ ሪ ም ር መ ራ ው ም ሄ ፓ ታ ይ ተ ስ "ቢ" እ ና "ሲ" ቫ ይ ረ ስ ን በ ደ ም ወ ስ ጥ መ ኖ ር ና አ ለ መ ኖ ር ሚ ረ ጋ ገ ጥ ይ ሆ ና ል :: የ ደ ም ና ሙ ና ው ም የ ሚ ወ ሰ ደ ዉ ን ጽ ህ ና ዉ በ ተ ጠ በ ቀ አ ዲ ስ እ ና በ ታ ሸ ገ ሚ ፌ ኖ ና ስ ሪ ን ጅ ' ው::

በ ጥ ና ቱ ሊ ከ ሰ ቱ የ ሚ ች ሉ ተ ያ ያ ዥ ች ግ ሮ ች

3 ሚ ሊ ሊ ት ር የ ደ ም ና ሙ ና ው ን ለ መ ሰ ድ ሚ ፌ ኤ ሲ ገ ባ ከ ሜ ዱ ጥ ረ ዉ የ ቅ ጽ በ ት የ ህ ም ም ስ ሜ በ ስ ተ ቀ ር የ ጎ ላ ች ግ ር አ ያ መ ጣ ም ነ ገ ር ግ ን ም ች ት ካ ል ተ ሰ ማ ም ት ህ ክ ም እ ን ዲ ያ ይ ዎ ት ይ ደ ረ ጋ ል ::

በ ጥ ና ቱ በ መ ሳ ተ ፍ የ ሚ ኝ ጥ ቅ ም

የ ደ ም ና ሙ ና የ ላ ብ ራ ቶ ሪ ዉ ጤ ት ም ን ም አ ይ ነ ት ች ግ ር ካ ሳ የ የ መ ድ ሃ ኒ ት ት እ ዛ ዝ ና የ ባ ለ ሙ ያ ም ክ ር ይ ሰ ጥ ዎ ታ ል፡ ::

የ ጥ ና ቱ መ ረ ጃ ዎ ች ሚ ስ ጥ ራ ዊ ነ ት

በጥናቱ ወስጥ የተሰበሰቡ ማንቸወም ግላዊ መረጃዎች ሚስጥራዊነታቸዉ የተጠበቀ ይሆናል፡፡ ከማንነትዎ ጋር በቀጥታ ተያያዥነት ያላቸዉ መረጃዎች በማኔ በዋና ተመራማሪዉ ሚስጥራዊ በሆነ የመረጃ ጥንቅር ዘዴ ከተቀየሩ በኃላ ብቻ ለምርምር ሂደቱ የሚዉሉ ይሆናሉ፡፡

የ ጥ ና ቱ ን ዉጤት ስ ለ ማ ወ ቅ

ከዚህ ጥናት ዉጤት በተለያዩ የህትመት ወጪቶች የሚቀርብ ሲሆን ይህ ከማንነቶዎ ጋር የተያያዘ ምንም አይነት መረጃን አያካትትም ፡፡ ስለዚህም የጥናቱን ዉጤት በሪፖርት እናቀርበው ዘንድ ፈቃደዎን እንጠይቃለን ፡፡

ከጥናቱ ስለ መዉጣት ና ስለማቋረጥ

ይህ ጥናት በፈቀደኝነት ላይ የተመሰረተ እንደመሆኑ መጠን በማንኛዉም ወቅት በፈቃድዎ ከጥናቱ መዉጣት ይችላሉ፡፡ ከጥናቱ ቢወጡም እንኳን የተለመዷዉን የህክምና እርዳታ በጠፋ ተቋሙ ዉስጥ በማንኛዉም ጊዜ የማግኘት መብት አልዎት፡፡

ከጥናቱ ጋር በተያያዘ ማንቸወም ጥያቄ ቢኖርዎ በሚከተለዉ አድራሻ ጥያቄዎን ማቅረብ ይችላሉ፡ -

ዋና ተመራማሪ፡ -ትዕግስት ብርቁ

አድራሻ፡ - ጎንደር ዩኒቨርስቲ

ስልክ፡ - +251918414446 (ሞባይል)

ኢሜል ፡ - tigib41@gmail.com

ስለ ስምምነቱ ሚረጋገጫ ፊርማ

እኔ ስሜ ከታች የተገለፀዉ የጥናቱ ተሳታፊ ለመሆን ስወስን የጥናቱን አላማዎች አሰራሮችና ቅድመ ሁኔታዎች በግልጽ በመረዳትና ከጥናቱ ተሳታፊነት ፈቃደኛነቴን በማንኛውም ደረጃ የማነሳት መቡቴን በሚጋጥ ነዉ፡፡

እኔ ---------- በጥናቱ ተሳታፊ መሆኔን በፊርሜ እያረጋገጥሁ ይህንን ስወስን በጥናቱ ሳቢያ ሊከሰቱ የሚችሉ አደጋዎች በሚባ የተረዳሁ ና ከጥናቱ በማንኛውም ደረጃ እራሴን ለማረዝ ብወስን ተገቢ የሆኑ ህክምናዎች ና እገዛዎች ሁሉ እነደሚደነፍጉኝ በሙሉ ነዉ፡፡ እነዚህ መረጃዎች ሁሉ በሚባ በምረዳዉ ቋንቋ የተገለጸልኝ መሆኑን በፊርሜ አረጋግጣለሁ ፡፡

የጥናቱ ተሣታፊ ሙሉ ስም ----------

ፊ ር ሜ ----------

የተመራመረዉ ሙሉ ስም ----------

ፊርሜ ----------

የምክክር ሙሉ ስም ----------

ፊርሜ ----------

ANNEX III. English Version of Questionnaire

University of Gondar

College of Medicine and Health Sciences

School of Biomedical and Laboratory Science

Part 1 Questioners to assess socio demographic characteristics

Code…… Date			
Ser.No.	Questions	Categories and Code	skip
1.1	Sex	1. Female 2. Male	
1.2	How old are you?	……..age(yr)	
1.3	Work experience	……yr	
1.4	Current residence?	1. Urban 2. Rural	
1.5	Educational status	1. Elementary 2. High school 3. Collage and above	
1.6	Religion	1. Orthodox 2. Muslim 3. Others	
1.7	Marital status	1. Single 2. Married 3. Widowed 4. Divorced	

Part 2 RISK ASSESMENT

Ser. No.	Question	Categories and Code	Skip
2.1	History of hospitalization?	0.Yes	

		1. No	
2.2	History of body Tattooing?	0. Yes 1. NO	
2.3	Dental extraction at home or health facility?	0. Yes 1. No	
2.4	History of blood transfusion history?	0. Yes 1. No	
2.5	History of surgical history	0. Yes 1. No	
2.6	How many sexual partners do you have	0. No 1. One 2. two and above	
2.7	Family history of liver disease?	0. Yes 1. No	
2.8	History of jaundice or liver disease?	0. Yes 1. No	
2.9	Sharing of shaving blade or nail cutter with others?	0. Yes 1. No	
2.10	Ear piercing?	0. Yes 1. No	
2.11	Nose piercing?	0. Yes 1. No	
2.12	Circumcision?	0. Yes 1. No	
2.13	History of sexual transmitted infection?	0. Yes 1. No	
2.14	Ever had war related injury?	0. Yes 1. No	

ANNEX IV. Amharic Version of Questionnaire

ክፍል1 ማህበራዊ ኑክ ሚጃዎች

ኮድ ፡ _____		ቀን ፡ _____	
ተራቁጥር	ጥያቄ	አማራጭ መልሶች	ወደ ጥያቄ ..... ይለፉ
1.1	ዕ ታ	1. ሴ ት 2. ወ ን ድ	
1.2	እድሜ	[_____] አመት	
1.3	ወታደር ሁነ ው ስንት አመት ሰሩ?	(.....) አመት	
1.4	የመኖሪያ አካባቢ?	1. ከተማ 2. ገጠር	
1.5	የትምህርት ደረጃ	1. የመጀመሪያ ደረጃ ት/ት (1-8) 2. የሁለተኛ ደረጃ ት/ትና ሚኒዶ(9-12) 3. ኮሌጅ እና ከዛ በላይ	
1.6	ሀይማኖት	1. ኦርቶዶክስ 2. ሙስሊም 3. ሌላ፡ ይጠቀስ	
1.7	የጋብቻ ሁኔታ	1. ያላገባ/ች 2. ያገባ/ች 3. የሞተበት/ባት 4. የፈታ/ች	

ክፍል 2፡ ለሄፓታይትስ ቢ ና ሲ አጋላጭ የሆኑ ሁኔታዎችን የሚዳስሱ ጥያቄዎች

ተራቁጥር.	ጥያቄ	አማራጭ መልሶች	ወደ ጥያቄ ..... ይለፉ

2.1	ከዚህ በፊት ተኝተው ታክመው ያውቃሉ?	0. አዎ 1. አላውቅም	
2.2	ሰመኒትዎን ተነቅሰዉ ያውቃሉ?	2. አዎ 3. አላውቅም	
2.3	ጥርስወን አስነቅለዉ ያውቃሉ?	0. አዎ 4. አላውቅም	
2.4	ደም ከሌለ ሠዉ ተሰጥቶዎት ያውቃል?	0. አዎ 1. አላውቅም	
2.5	ማኘወንም አይነት ቀዶ ጥገና አሰርተዉ ያውቃሉ?	0. አዎ 1. አይደለም	
2.6	ከአንድ በላይ የፍቅር ጉደኛ ነበረዎት? (ከአንድ ሠዉ በላይ የግብረስጋ ግንኙነት ነበረዎት?)	0. የለኝም 1. አንድ 2. ሁለት	
2.7	ከቤተሰቦዎ በጉበት ህመም የተጠቃ አለን?	0. አዎ 1. የለም	
2.8	በጉበት በሽታ ተጠቅተው ያውቃሉ?	0. አዎ 1. አላውቅም	
2.9	ሌላ ሰዉ በተጠቀማት ምላጭ ወይም የጥፍር መቁረጫ ተጠቅመዉ ያውቃሉ?	0. አዎ 0. አላውቅም	
2.10	ጆሮዎን ተበስተዉ ያውቃሉ?	0. አዎ 1. አላውቅም	
2.11	አፍንጫዎን ተበስተዉ ያውቃሉ?	0. አዎ 1. አላውቅም	
2.12	ግርዛት ተገርዘዋል?	0. አዎ 1. አላውቅም	
2.13	የአባላዘር በሽታ ታመው ያውቃሉ?	0. አዎ 1. አላውቅም	
2.14	በጦርነት ወቅት ቆስለው ያውቃሉ?	0. አዎ 1. አላውቅም	

Annex V. Laboratory Procedures and Data Collection Format

Serological Test Principle

EUGENE® HBsAg:

The EUGENE® HBsAg rapid test (Shanghai Eugene Biotech co., Ltd) is a lateral flow immune chromatographic assay for the qualitative determination of HBsAg (a marker of HBV infection) in human serum or plasma.

Test Principle

The EUGENE® HBsAg rapid test a qualitative immune chromatographic assay employing a unique combination of monoclonal dye-conjugate (colloidal gold) and polyclonal solid phase

antibodies to selectively identify HBsAg of HBV infection with a high degree of sensitivity. In this test, plasma or serum specimen is added directly to the sample pad. As the test sample flows through the sample pad, the labeled antibody-dye conjugate binds to HBsAg forming an antibody-antigen complex. The pad is in contact with a chromatographic test strip which contains a region of immobilized polyclonal anti-HBsAg antibody in the test line. The antibody-antigen complex moves by capillary action along the strip forming a line of immobilized complex by the zone of antibody in the test line, indicating the presence of HBsAg in the sample (pink line). If no antigen is present, the test line will remain clear. The appearance of a pink line in the control line shows that the test has been carried out correctly.

Test Procedure

1. Bring the complete kit and sample to be tested to room temperature (15 – 30^{O}C) prior to testing.
2. Remove the test device from its protective pouch, lay it on a dry and clean flat surface, and label the device with patient or control number.
3. Use the dropper or pipette to withdraw serum specimen from the specimen collection container and dispense 2 – 3 drops (approximately 80 - 120µl) in to the sample well and start the timer.
4. Wait for colored bands to appear. For strong positive, results may be observed within one minute. For 5ng/ml, read within 5 – 10 minutes; for 1.5 – 2ng/ml read within 15 – 20 minutes. However, to confirm negative results, the complete reaction time 20 – 30 minutes is required. Do not interpret result after 30 minutes.

Interpretation of Results

Negative: One pink line appears in control line, showing the test has been carried out correctly. There will be no line in test region.

Positive: In addition to a pink colored control line, a distinct pink colored band will also appear in the test region. Any shade of color in the test region (T) should be considered positive.

Invalid: A total absence of color in both regions is an indication of procedure error and/or that the test reagent has deteriorated. Repeat the testing using a new device.

Anti-HCV Rapid Test

The EUGENE® Anti-HCV rapid test (Shanghai Eugene Biotech co., Ltd) is a sandwich lateral flow immune chromatographic assay for the qualitative detection of antibodies to HCV in human serum or plasma.

Test Principle

The EUGENE® Anti-HCV rapid test is a lateral flow immune chromatographic assay screening serum or plasma using recombinant HCV proteins. Recombinant antigens of HCV labeled by gold conjugates are used in test band as capture materials, and anti-rabbit HCV antibody is used in the control band. When a sample is added in to the sample well of the device, it migrates through the membrane strip. If the antibodies to HCV present in the specimen, a complex of antibody- gold conjugated recombinant antigens will be formed, which is then captured by antigen immobilized in the test zone of the membrane, producing a visible pink color band of immune complex conjugate on the membrane. The color intensity will depend on the concentration of the ant-HCV present in the sample. Absence of the test band suggests a negative result. The test contains an internal control (C band) which should exhibit a pink colored band of the immune complex conjugate regardless of color development on the test band. Otherwise, the test result is invalid and the specimen must be retested with another device.

Test Procedure

1. Bring the complete kit and sample to be tested to room temperature (15 – 30^{O}C) prior to testing.
2. Remove the test device from its protective pouch, lay it on a dry and clean flat surface, and label the device with patient or control number.
3. Hold the dropper vertically and transfer only one drop (about 25μl) of serum or plasma to the specimen well (S) of the test device, then add two drops (about 100μl) of buffer and start the timer.
4. Wait for the red line (s) to appear. The result should be read at 10 – 20 minutes. Do not interpret result after 20 minutes.

Interpretation of Results

Negative: If only the C band is developed, the test indicates that no detectable antibodies to HCV present in the specimen. The result is negative.

Positive: If both C and T bands are developed, the test indicates for the presence of antibodies to HCV in the specimen. The result is positive. Any shade of color in the test region (T) should be considered positive.

Invalid: If no C band is developed, the assay is in valid regardless of color development on the T band. Repeat the assay using a new device.

Laboratory data collection format

Code No.	Laboratory result for							
	HBsAg				Anti-HCV Ab			
001.	Positive		Negative		Positive		Negative	
002.	Positive		Negative		Positive		Negative	
003.	Positive		Negative		Positive		Negative	
004.	Positive		Negative		Positive		Negative	
005.	Positive		Negative		Positive		Negative	
006.	Positive		Negative		Positive		Negative	
007.	Positive		Negative		Positive		Negative	
008.	Positive		Negative		Positive		Negative	
009.	Positive		Negative		Positive		Negative	
010.	Positive		Negative		Positive		Negative	
011.	Positive		Negative		Positive		Negative	
012.	Positive		Negative		Positive		Negative	
013.	Positive		Negative		Positive		Negative	
014.	Positive		Negative		Positive		Negative	
015.	Positive		Negative		Positive		Negative	
016.	Positive		Negative		Positive		Negative	
017.	Positive		Negative		Positive		Negative	
018.	Positive		Negative		Positive		Negative	
019.	Positive		Negative		Positive		Negative	
020.	Positive		Negative		Positive		Negative	
021.	Positive		Negative		Positive		Negative	
022.	Positive		Negative		Positive		Negative	
023.	Positive		Negative		Positive		Negative	
024.	Positive		Negative		Positive		Negative	

Make an "X" mark for the results

Declaration

I, the undersigned, senior Medical Microbiology student declare that this thesis proposal is my original thesis in partial fulfillment of the requirements for degree of Master of Science in Medical Microbiology.

Name: - Tigist Birku

Signature: ----------

Place of submission: School of Biomedical and Laboratory sciences, College of Medicine and Health Sciences, University of Gondar.

Date of submission: ----------

This thesis was submitted for examination with my/ our approval as university advisor(s)

Advisor(s)

	Name	Signature	Date
1	Baye Gelaw (PhD)	----------	----------
2	Feleke Moges (Prof.)	----------	----------

Examiner(s)

Name_____ Signature_____ Date _____

Name _____ Signature _____ Date _____